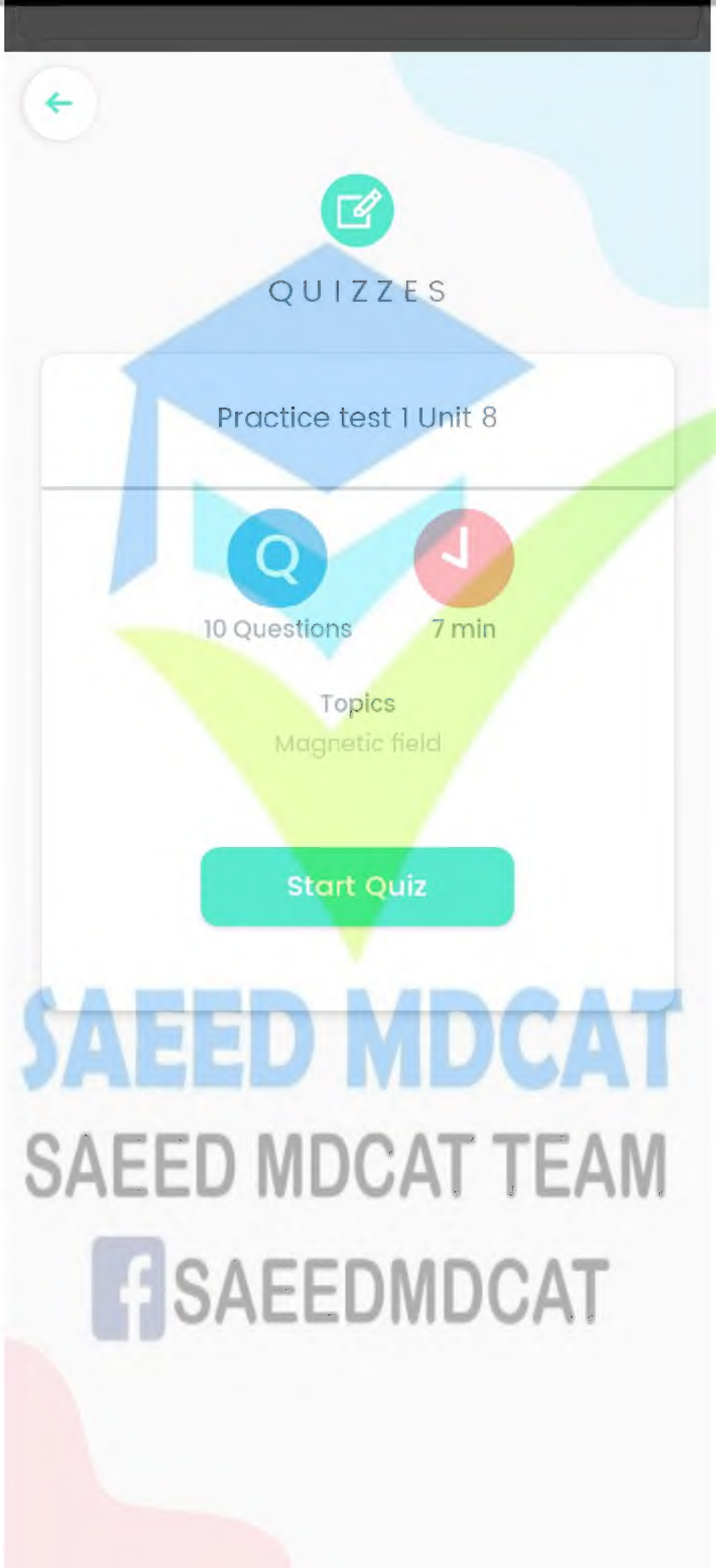


06 : 58

Q 1/10 7 min Hint

Q : Two parallel beams of positrons moving in the same direction will

A repel each other

B not interact with each other

C attract each other

D be deflected normal to the plane containing the two beams

06 : 56

Q 2/10 7 min Hint

Q : The force that appears as a result of the interaction between two moving charges is called

A induced force

B electrostatic force

C magnetic force

D gravitational force

06 : 54

Q 3/10 7 min Hint

Q : The study of magnetism produced by electric current and electric current produced by changing magnetic field is called

A magnetic field

B electric current

C electric and magnetic field

D electromagnetism

06 : 51

Q 4/10 7 min Hint

Q : If a current flows through the wire directed out of the paper, the magnetic field is represented by

A clockwise circular lines

B anticlock wise circular lines

C lines parallel to the wire

D lines perpendicular to the wire

06 : 48

Q 5/10 7 min Hint

Q : The relationship between Tesla and smaller unit Gauss of magnetic induction is given by

A $1T = 10^3\ G$

B $1T = 10^{-4}\ G$

C $1T = 10^{-2}\ G$

D $1T = 10^4\ G$

06 : 46

Q 6/10 7 min Hint

Q : The direction of the magnetic lines of force can be found by using:

A Right hand rule

B Henry's law

C Left hand rule

D Faraday's law

06 : 44

Q 7/10 7 min Hint

Q : The direction at a point on the magnetic lines of force can be taken along:

A normal at that point

B the tangent at that point

C axis of the magnetic line of force at that point

D can't be taken

06 : 39

Q 8/10 7 min Hint

Q : The force that appears as a result of the interaction between two moving charges is called

A induced force

B electrostatic force

C magnetic force

D gravitational force

06 : 37

Q 9/10 7 min Hint

Q : The study of magnetism produced by electric current and electric current produced by changing magnetic field is called

A magnetic field

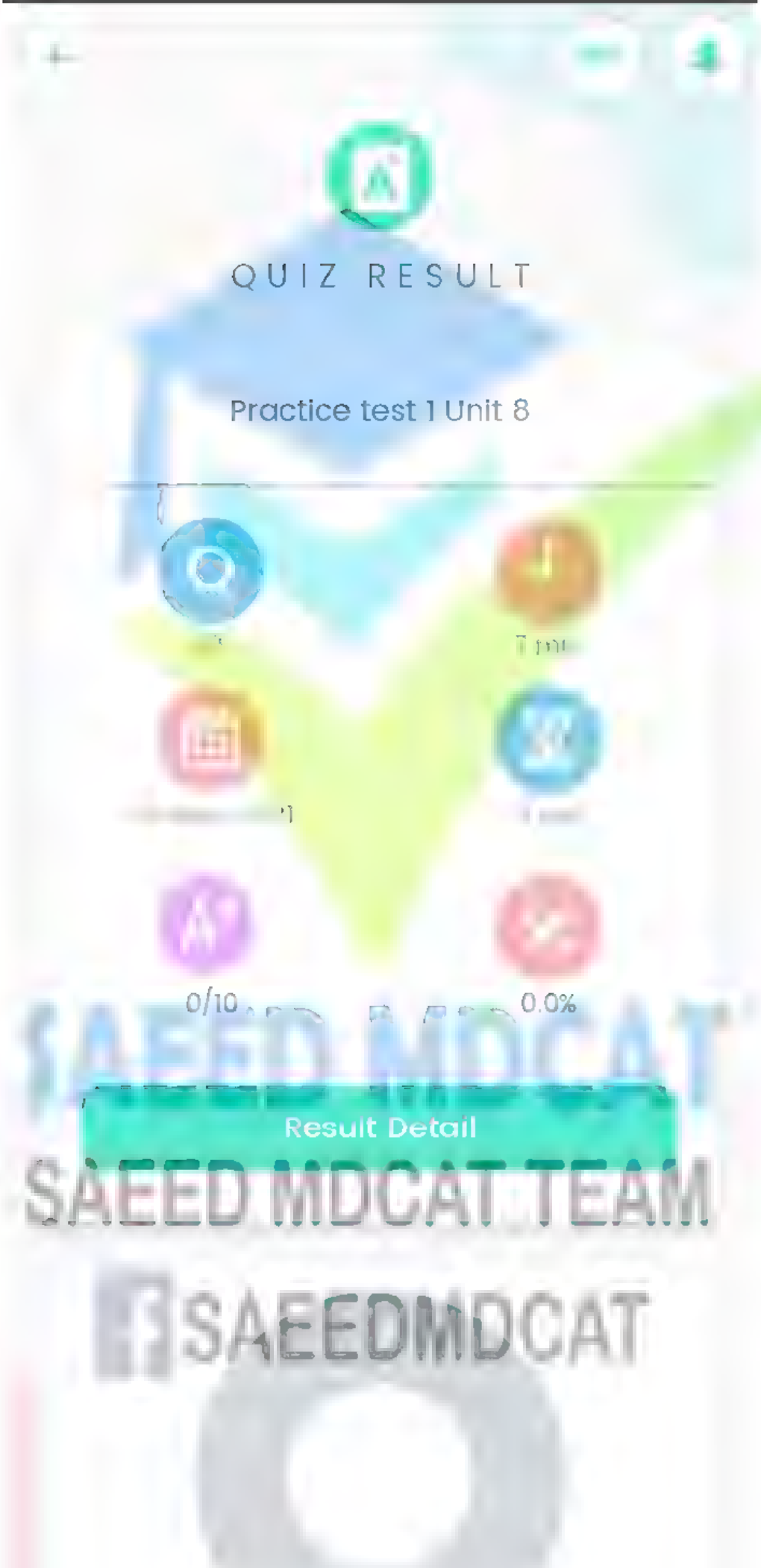
B electric current

C electric and magnetic field

D electromagnetism

Q : The direction of magnetic fie d due to current carry ng conductor can be determined by

- left hand rule
- right hand rule
- palm right hand rule
- Fleming's left hand rule



Correct

Unattempted

Q : Two parallel beams of positrons moving in the same direction will

repel each other

not interact with each other

attract each other

be deflected normal to the plane containing the two beams

Explanation

Similar case, two wires carrying current in same direction.

Correct

Unattempted

Incorrect

2/

Q : The force that appears as a result of the interaction between two moving charges is called

induced force

electrostatic force

magnetic force

gravitational force

Explanation

Book line

Correct

Unattempted

Q : The study of magnetism produced by electric current and electric current produced by changing magnetic field is called

- magnetic field
- electric current
- electric and magnetic field
- electromagnetism

Explanation

Definition

Correct Unattempted

Incorrect 4/

Q : If a current flows through the wire directed out of the paper, the magnetic field is represented by

clockwise circular lines

anticlock wise circular lines

lines parallel to the wire

lines perpendicular to the wire

Explanation

nformation

Q : The relationship between Tesla and smaller unit Gauss of magnetic induction is given by

A $1T - 10^3 G$

B $1T = 10^4 G$

C $1T = 10^{-2} G$

D $1T = 10^4 G$

Explanation

$1T = 10^{4} G$

Correct Unattempted

Incorrect 6/

Q : The direction of the magnetic lines of force can be found by using·

Right hand rule

Henry's law

Left hand rule

Faraday's law

Explanation

Direction of magnetic lines of forces can be found by right hand rule.

Correct

Unattempted

Incorrect

Q : The direction at a point on the magnetic lines of force can be taken along

normal at that point

the tangent at that point

axis of the magnetic line of force at that point

can't be taken

Explanation

Direction of magnetic field is along the tangent on a curve.

Correct

Unattempted

Incorrect

Bo

Q : The force that appears as a result of the interaction between two moving charges is called

induced force

electrostatic force

magnetic force

gravitational force

Explanation

Book line

← Practice test 1 Unit 8

Correct

Unattempted

Q : The study of magnetism produced by electric current and electric current produced by changing magnetic field is called

magnetic field

electric current

electric and magnetic field

electromagnetism

Explanation

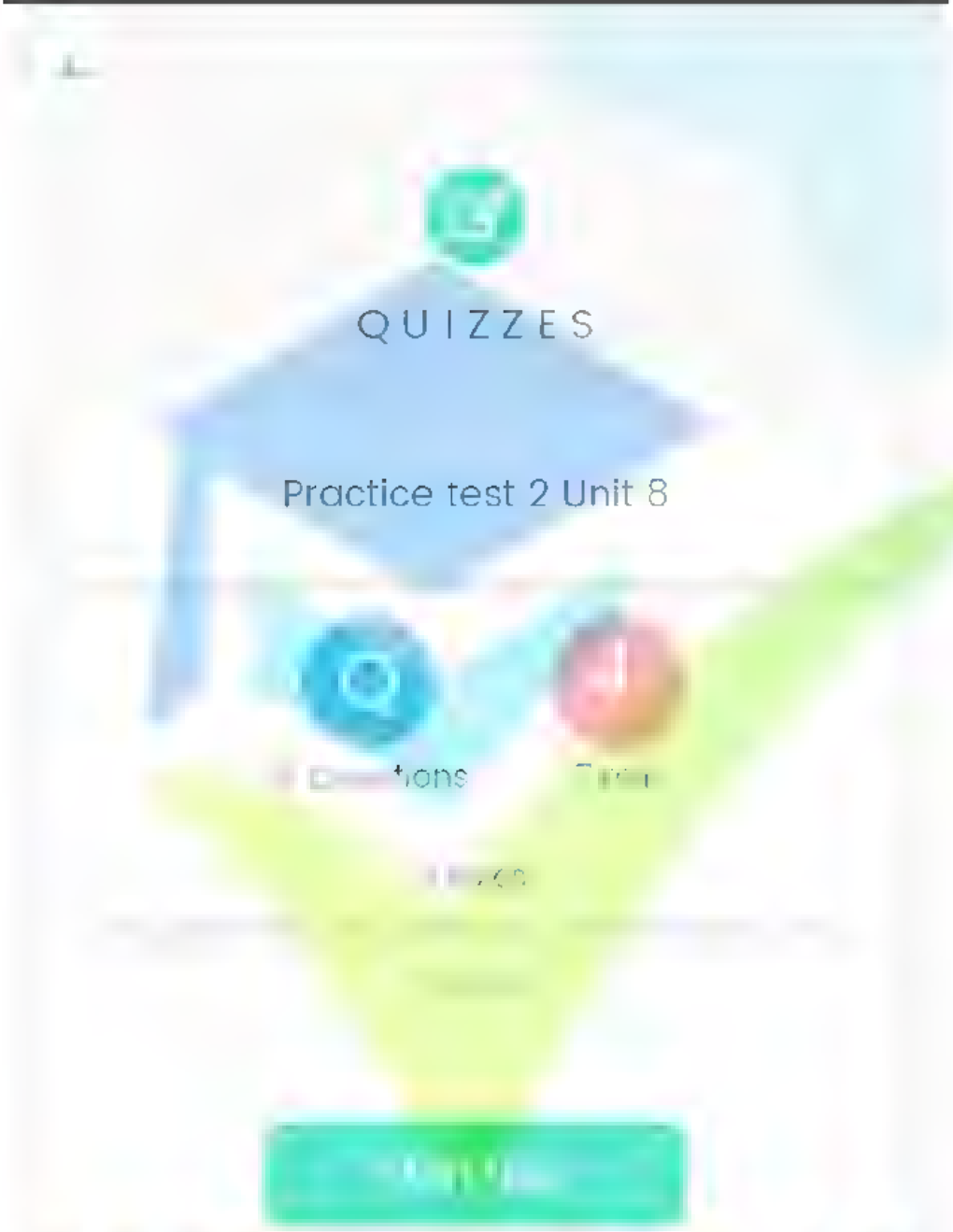
Definition

Q : The direction of magnetic fie d due to current carry ng conductor can be determined by

- left hand rule
- right hand rule
- palm right hand rule
- Fleming's left hand rule

Explanation

Right hand rule.



Q : Magnetic flux would be maximum when

- $\vec{B}$ is parallel to $\vec{A}$
- $\vec{B}$ is at 45° to $\vec{A}$
- $\vec{B}$ is perpendicular to $\vec{A}$
- none of these

Q : The Weber is unit of measure of

A conductance

B electric current

C magnetic flux

D electric flux

Q : If 0.5 T magnetic field is perpendicular to the 0.5 m^2 area then the magnetic flux would be

- 0.25 wb
- 6.25 wb
- 1.25 wb
- zero

Q : The magnetic field in a certain region is given by $40\hat{i} - 18\hat{k}$. How much flux passes through a 5.0 cm^2 area loop in this region if loop lies flat in YZ plane?

- 90×10^{-4} Wb
- 2×10^{-2} Wb
- 2×10^{2} Wb
- 9×10^{-4} Wb

Q : For which of the following angles magnetic flux reduces to half of its maximum?

- $\theta = 45°$
- $\theta = 180°$
- $\theta = 0°$
- $\theta = 60°$

Q : The relationship between Tesla and smaller unit Gauss of magnetic induction is given by

- $1T = 10^{3}\ G$
- $1T = 10^{-4}\ G$
- $1T = 10^{-2}\ G$
- $1T - 10^{4}\ G$

Q : The direction of the magnetic lines of force can be found by using:

- Right hand rule
- Henry's law
- Left hand rule
- Faraday's law

Hint

Q : A conducting rod of 1 meter length and 1 kg mass is suspended by two vertical wires through its ends. An external magnetic field of 2 Tesla is applied normal to the rod. Now the current to be passed through the rod so as to make the tension in the wires zero is [take g = 10 ms-2]

0.5 Amp

15 Amp

5 Amp

1.5 Amp

Q : The diagram shows a straight wire carrying a flow of electrons into the page. The wire is between the poles of a permanent magnet. The direction of the magnetic force exerted on the wire is

- ↓
- →
- ←
- ↑

Q : Magnetic flux and flux density are related by

_____

A Magnetic flux = flux density / area

B Magnetic flux = flux density x area

C Flux density = magnetic flux area

D Flux density = magnetic flux × area

QUIZ RESULT

Practice test 2 Unit 8

0/10

0.0%

Result Detail

Q : Magnetic flux would be maximum when

- $\vec{B}$ is parallel to $\vec{A}$
- $\vec{B}$ is at 45° to $\vec{A}$
- $\vec{B}$ is perpendicular to $\vec{A}$
- none of these

Explanation

As, $\phi = BA\cos\theta$

$\phi_{max} = BA$ *When* $\cos\theta = 1 \rightarrow \theta = 0^{\circ}$

So, flux will be maximum when $\vec{B}$ is parallel to $\vec{A}$

Q : The Weber is unit of measure of

- conductance
- electric current
- magnetic flux
- electric flux

Explanation

Weber is the SI unit of magnetic flux

Correct Unattempted

Incorrect 3/

Q : If 0.5 T magnetic field is perpendicular to the 0.5 m^2 area then the magnetic flux would be

0.25 wb

6.25 wb

1.25 wb

zero

Explanation

$\phi = BA\cos\theta$ Here surface area is perpendicular hence vector area must be parallel with magnetic field. ($\theta = 0°$)

Incorrect 4/10

Q : The magnetic field in a certain region is given by $40\hat{i} - 15\hat{k}$. How much flux passes through a 5.0 cm^2 area loop in this region if loop lies flat in YZ plane?

- 90×10^{-4} Wb
- 2×10^{-2} Wb
- 2×10^{2} Wb
- 9×10^{-4} Wb

Explanation

$$\vec{B} = 40\hat{i} + 0\hat{j} - 15\hat{k}$$

$$\vec{A} = (5\hat{i} + 0\hat{j} + 0\hat{k}) \times 10^{-4} m^2$$

$$\phi_B = \vec{B} \cdot \vec{A}$$

$$= 40 \times 5 \times 10^{-4}$$

$$= 2 \times 10^{-2} Wb$$

Correct

Unattempted

5/10

Q : For which of the following angles magnetic flux reduces to half of its maximum?

$\theta = 45°$

$\theta = 180°$

$\theta = 0°$

$\theta = 60°$

Explanation

$\phi_b = BA\cos\theta$

$\phi_b = (\phi_b)_{max}\cos\theta$

If $\theta = 60°$, then

$\phi_b = (\phi_b)_{max}\cos 60°$

$$\phi_b = \frac{1}{2}(\phi_b)_{max}$$

Q : The relationship between Tesla and smaller unit Gauss of magnetic induction is given by

1T - 10^3 G

1T = 10^4 G

1T = 10^{-2} G

1T = 10^4 G

Explanation

1T = 10^4 G

Correct

Unattempted

Incorrect

Q : The direction of the magnetic lines of force can be found by using·

Right hand rule

Henry's law

Left hand rule

Faraday's law

Explanation

Direction of magnetic lines of forces can be found by right hand rule.

Q : A conducting rod of 1 meter length and 1 kg mass is suspended by two vertical wires through its ends. An external magnetic field of 2 Tesla is applied normal to the rod. Now the current to be passed through the rod so as to make the tension in the wires zero is [take g = 10 ms-2]

- 0.5 Amp
- 15 Amp
- 5 Amp
- 1.5 Amp

Explanation

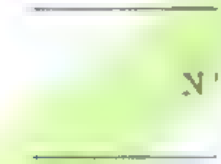
$F_{magnetic} = F_{gravitational}$

$F_b = F_g$

$ILB = mg$

$I = \frac{mg}{BL} = \frac{1x10}{1x2} = 5\ Amp$

Q : The diagram shows a straight wire carrying a flow of electrons into the page. The wire is between the poles of a permanent magnet. The direction of the magnetic force exerted on the wire is



Explanation

Right hand palm rule.

$\vec{F} = i(\vec{L} \times \vec{B})$

Cross product of L and B

Q : Magnetic flux and flux density are related by

A Magnetic flux = flux density / area

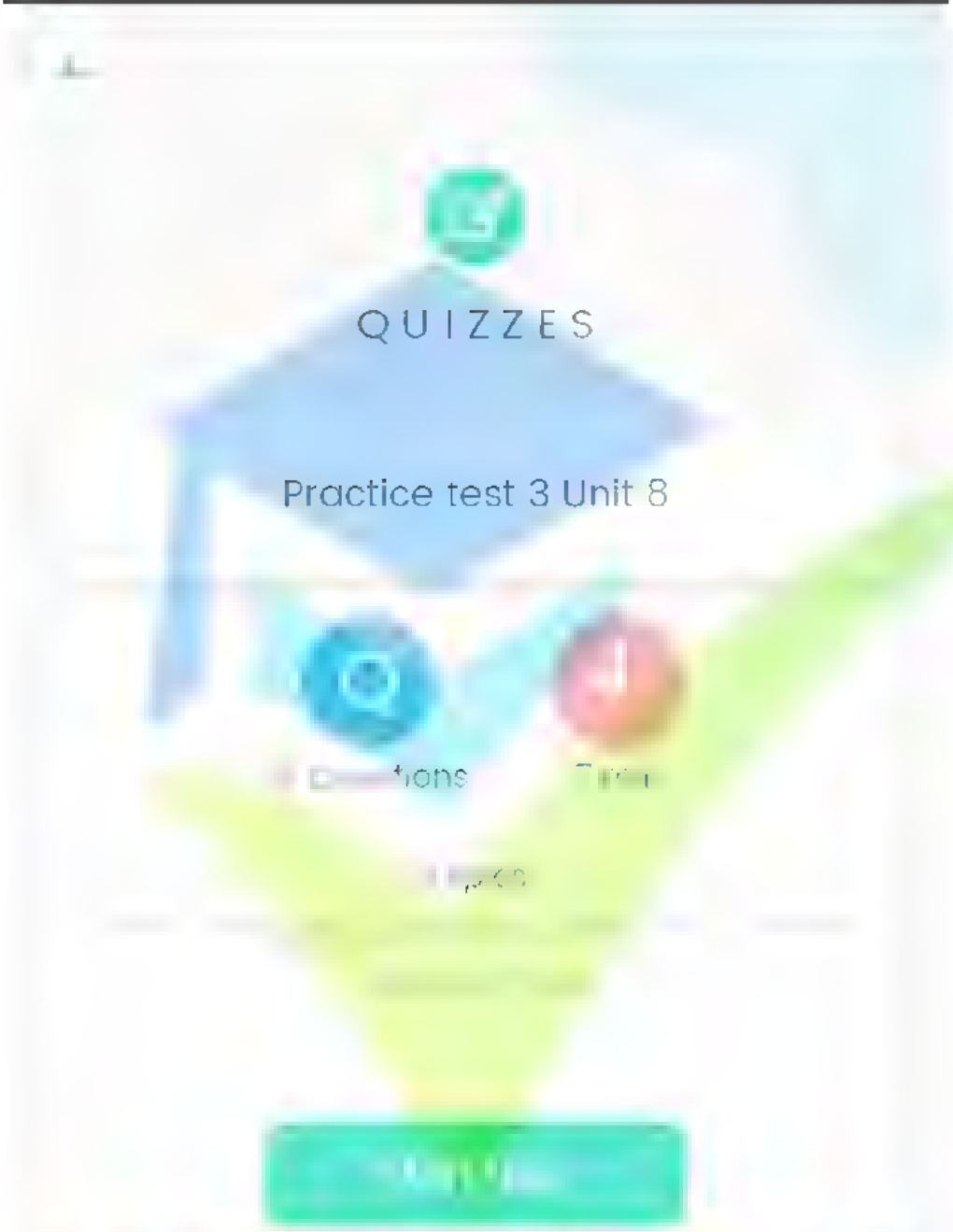
B Magnetic flux = flux density x area

C Flux density = magnetic flux area

D Flux density = magnetic flux × area

Explanation

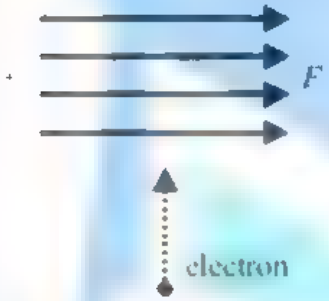
$\phi = BA$



Q : The velocity of a particle of charge $+4.0 \times 10^{-9}$ C and mass 2×10^{-4}kg is perpendicu ar to a 0.1-tesla magnetic field. If the particle's speed is 3×10^{4} m/s, what is the acceleration of this particle due to the magnetic force?

- $0.0006\ m/s^2$
- $0.006\ m/s^2$
- $0.06\ m/s^2$
- $0.6\ m/s^2$

Q : An electron is projected at right angles to a uniform electric field E. It will deflect:



Into the plane of the paper

Out of the paper

To the left

To the right

06 54

Q : An electron enters a region of uniform perpendicular $\vec{E}$ and $\vec{B}$ fields. It is observed that the velocity $\vec{v}$ of the electron is undeflected. A possible explanation is:

- $\vec{v}$ is parallel to $\vec{E}$ and has magnitude E/B
- $\vec{v}$ is parallel to
- $\vec{v}$ is perpendicular to both $\vec{E}$ and $\vec{B}$ and has magnitude B/E
- $\vec{v}$ is perpendicular to both $\vec{E}$ and $\vec{B}$ and has magnitude E/B

Q : A proton (mass m and charge +e) and an α-particle (mass 4m and charge +2e) are projected with the same kinetic energy at right angles to the uniform magnetic field. Which one of the following statements will be true

- the α-particle and the proton will be bent in a circular path with the same radius
- the α-particle and the proton will go through the field in a straight line
- the α-particle will be bent in a circular path with a small radius that for the proton
- the radius of the path of the α-particle will be greater than that of the proton

Q : A charge of 1C is mov ng in a magnetic field of 0.5Tesla with a velocity of 10m/sec Perpendicular to the field. Force experienced is

- 5 N
- 10N
- 0.5 N
- 0N

Q :

A proton enters a magnetic field of flux density 1 5 weber/m^2 with a velocity of 2×10^7 m/sec at an angle of 30◦ with the field. The force on the proton will be

2.4×10^{-12}N

0.24×10^{-12}N

24×10^{-12}N

0.024×10^{-12}N

06 45

Q :

A positively charged particle moving due east enters a region of uniform magnetic field directed vertically upwards. The particle will

- Get deflected vertically upwards
- Move in a circular orbit with its speed increased
- Move in a circular orbit with its speed unchanged
- Continue to move due east

Q :

An electron is travelling in east direction and a magnetic field is applied in upward direction then electron will deflect in

- South
- North
- West
- East

06 39

Q :

A homogeneous electric field E and a uniform magnetic field **B** are pointing in the same direction. A proton is projected with its velocity parallel to **E**. It will

- Go on moving in the same direction with increasing velocity
- Go on moving in the same direction with constant velocity
- Turn to its right
- Turn to its left

Q :

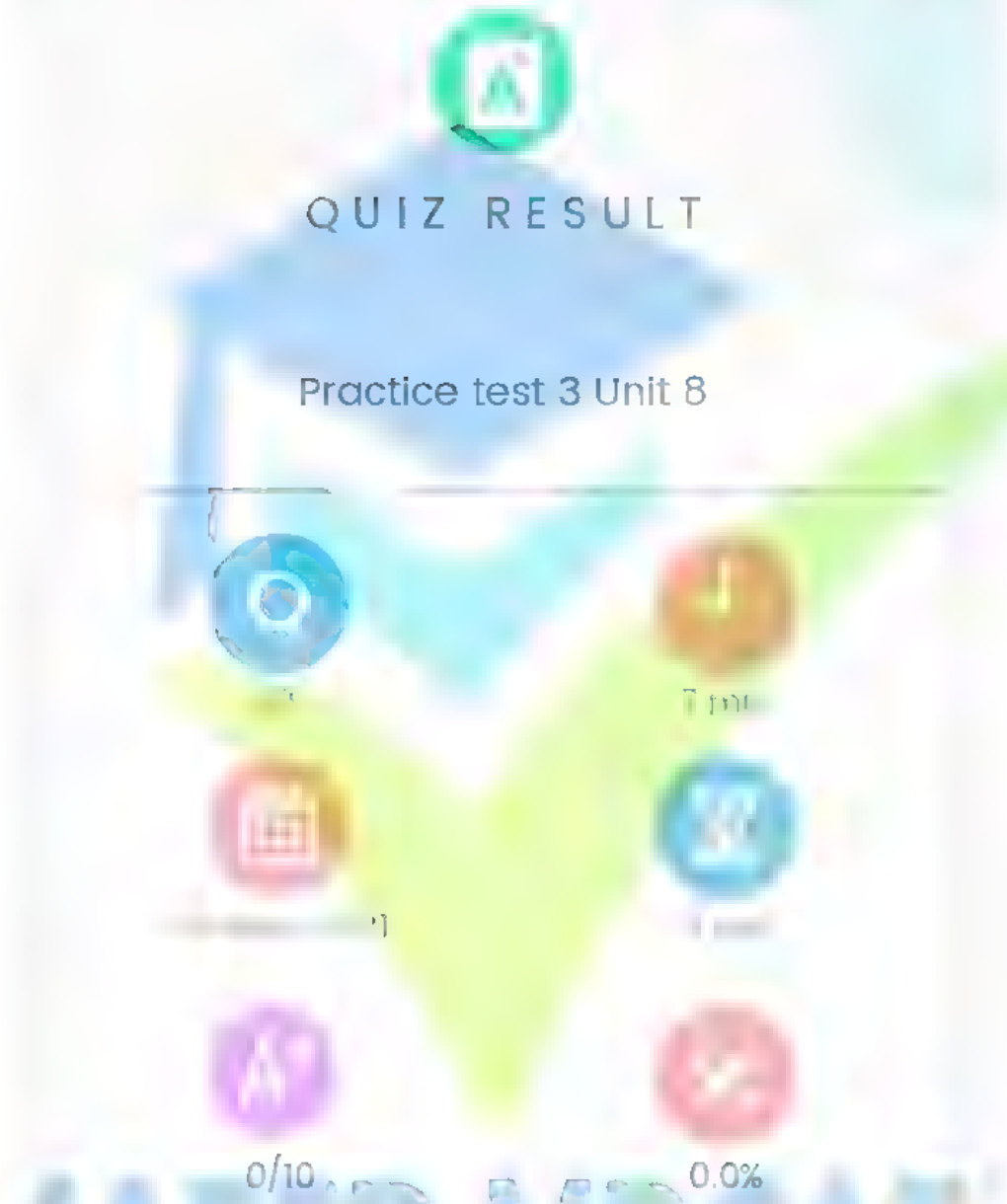
An electron is travelling along the x-direction It encounters a magnetic field in the y-direction. Its subsequent motion will be

Straight line along the x-direction

A circle in the xz-plane

A circle in the yz-plane

A circle in the xy-plane



Incorrect 1/10

Q : The velocity of a particle of charge $+4.0 \times 10^{-9}$ C and mass 2×10^{-4}kg is perpendicu ar to a 0.1-tesla magnetic field. If the particle's speed is 3×10^{4} m/s, what is the acceleration of this particle due to the magnetic force?

- $0.0006\ m/s^2$
- $0.006\ m/s^2$
- $0.06\ m/s^2$
- $0.6\ m/s^2$

Explanation

$$qvB = ma$$

$$a = \frac{qvB}{m}$$

$$a = \frac{4\times10^{-9}\times3\times10^{4}\times0.1}{2\times10^{-4}}$$

$$a = 6\times10^{-2}ms^{-2} = 0.06ms^{-2}$$

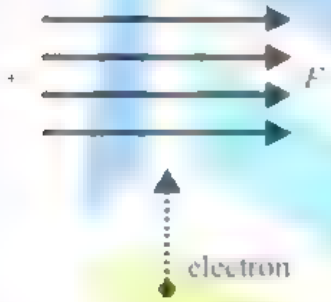
← Practice test 3 Unit 8

Correct

Unattempted

2/10

Q : An electron is projected at right angles to a uniform electric field E. It will deflect.



Into the plane of the paper

Out of the paper

To the eft

To the right

Explanation

Electron will move toward positive side i.e. towards eft.

Correct

Unattempted

3/10

Q : An electron enters a region of uniform perpendicular $\vec{E}$ and $\vec{B}$ fields. It is observed that the velocity $\vec{v}$ of the electron is undeflected. A possible explanation is:

- $\vec{v}$ is parallel to $\vec{E}$ and has magnitude E/B
- $\vec{v}$ is parallel to
- $\vec{v}$ is perpendicular to both $\vec{E}$ and $\vec{B}$ and has magnitude B/E
- $\vec{v}$ is perpendicular to both $\vec{E}$ and $\vec{B}$ and has magnitude E/B

Explanation

In velocity selector, $\vec{v}$ is perpendicular to both $\vec{E}$ and $\vec{B}$ given as $v = \frac{E}{B}$

Q : A proton (mass m and charge +e) and an α-particle (mass 4m and charge +2e) are projected with the same kinetic energy at right angles to the uniform magnetic field. Which one of the following statements will be true

B the α-particle and the proton will be bent in a circular path with the same radius

C the α-particle and the proton will go through the field in a straight line

D the α-particle will be bent in a circular path with a small radius that for the proton

E the radius of the path of the α-particle will be greater than that of the proton

Explanation

$r = \frac{\sqrt{2mK}}{qB}$ i.e. $r \propto \frac{\sqrt{m}}{q}$ Here kintic energy K land B are same

$$\therefore \frac{r_p}{r_a} = \frac{\sqrt{m_p}}{\sqrt{m_a}} \cdot \frac{q_a}{q_p} = \frac{\sqrt{m_p}}{\sqrt{4m_p}} \cdot \frac{2q_p}{q_p} = 1$$

← Practice test 3 Unit 8

Correct | Unattempted

Incorrect | 5/7

Q : A charge of 1C is moving in a magnetic field of 0.5Tesla with a velocity of 10m/sec Perpendicular to the field. Force experienced is

- 5 N
- 10N
- 0.5 N
- 0N

Explanation

$F = qBv = 1 \times 0.5 \times 10 = 5$ N

Correct

Unattempted

6/10

Q :

A proton enters a magnetic field of flux density 1.5 weber/m^2 with a velocity of 2×10^7 m/sec at an angle of 30◦ with the field. The force on the proton will be

2.4×10^{-12}N

0.24×10^{-12}N

24×10^{-12}N

0.024×10^{-12}N

Explanation

$$F = qvB\sin\theta = 1.6 \times 10^{-19} \times 2 \times 10^7 \times 1.5 \times \frac{1}{2}$$

Correct

Unattempted

Incorrect

Q :

A positively charged particle moving due east enters a region of uniform magnetic field directed vertically upwards. The particle will

Get deflected vertically upwards

Move in a circular orbit with its speed increased

Move in a circular orbit with its speed unchanged

Continue to move due east

Explanation

When particle enters perpendicularly in a magnetic field, it moves along a circular path with constant speed.

Q :

An electron is travelling in east direction and a magnetic field is applied in upward direction then electron will deflect in

- South
- North
- West
- East

Correct

Unattempted

Incorrect

9/10

Q :

A homogeneous electric field E and a uniform magnetic field **B** are pointing in the same direction. A proton is projected with its velocity parallel to **E**. It will

Go on moving in the same direction with increasing velocity

Go on moving in the same direction with constant velocity

Turn to its right

Turn to its left

Explanation

Here magnetic force is zero, but the velocity increases due to electric force

Q :

An electron is travelling along the x-direction. It encounters a magnetic field in the y-direction. Its subsequent motion will be

a) Straight line along the x-direction

b) A circle in the xz-plane

c) A circle in the yz-plane

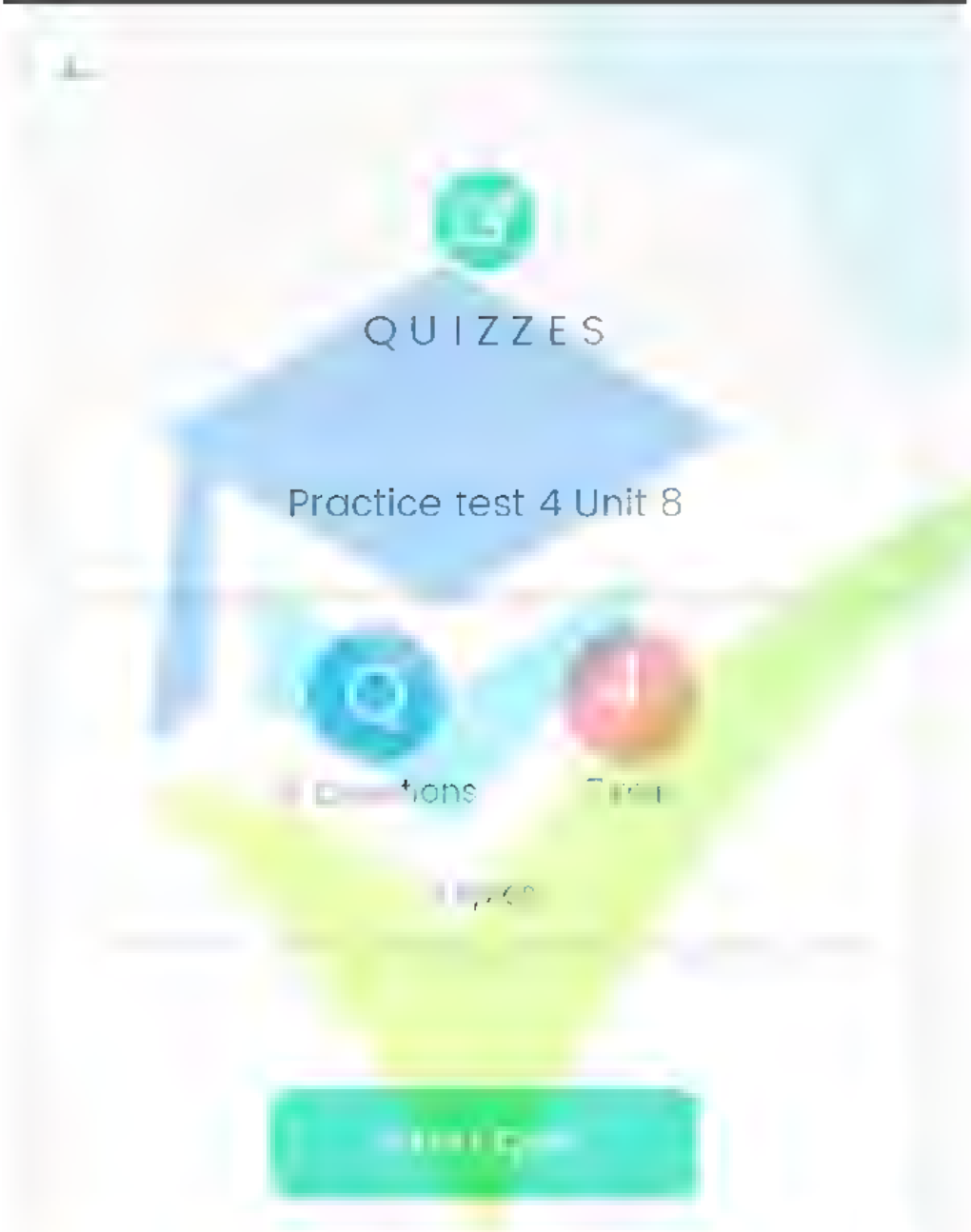
d) A circle in the xy-plane

Explanation

$$\vec{F} = -e(\vec{v} \times \vec{B}) \Rightarrow \vec{F} = -e[v\hat{i} \times B\hat{j}]$$

i.e. Force on electron is acting towards negative z-axis. Hence particle will move on a circle in xz-

plane.



Q : A photon while passing through a magnetic field are deflected towards

- north pole
- south pole
- are ion zed
- none of these

Q : An electron accelerated through a potential difference V passes through a uniform transverse magnetic field and experience a force F If the accelerating potential is increased to 2V, the electron in the same magnetic field will experience a force.

- F
- F/2
- $\sqrt{2}F$
- 2F

Q : Two ions having masses in the ratio 1:1 and charges 1:2 are projected into uniform magnetic field perpendicular to field with speeds in the ratio 2:3 the ratio of the radii of circular parts along which the two particles move is

- 4:3
- 2:3
- 3:1
- 1:4

Q : Lorentz electric force has direction

A similar to electric field

B opposite of electric field

C scalar quantity

D None

Q : The electric force can

- change the speed of particle
- cannot change the speed
- has not effect
- all of these

Q : A proton moving with a constant ve ocity passes through a region of space without any change in its velocity. If E and B represent the electric and magnetic fields respectively, then this region of space may have

- E=0,B≠0
- E≠0,B=0
- E=0,B=0
- E≠0,B≠0

Q :

A strong magnetic field is applied on a stationary electron, then

- The electron moves in the direction of the field
- The electron moves in an opposite direction
- The electron remains stationary
- The electron starts spinning

Q :

An electron enters a magnetic field whose direction is perpendicular to the velocity of the electron. Then

- The speed of the electron will increase
- The speed of the electron will decrease
- The speed of the electron will remain the same
- The velocity of the electron will remain the same

Q :

When a magnetic field is applied in a direction perpendicular to the d rection of cathode rays, then their

A Energy decreases

B Energy increases

C Momentum increases

D Momentum and energy remain unchanged

Q :

At a specific instant emission of radioactive compound is deflected in a magnetic field. The compound can emit

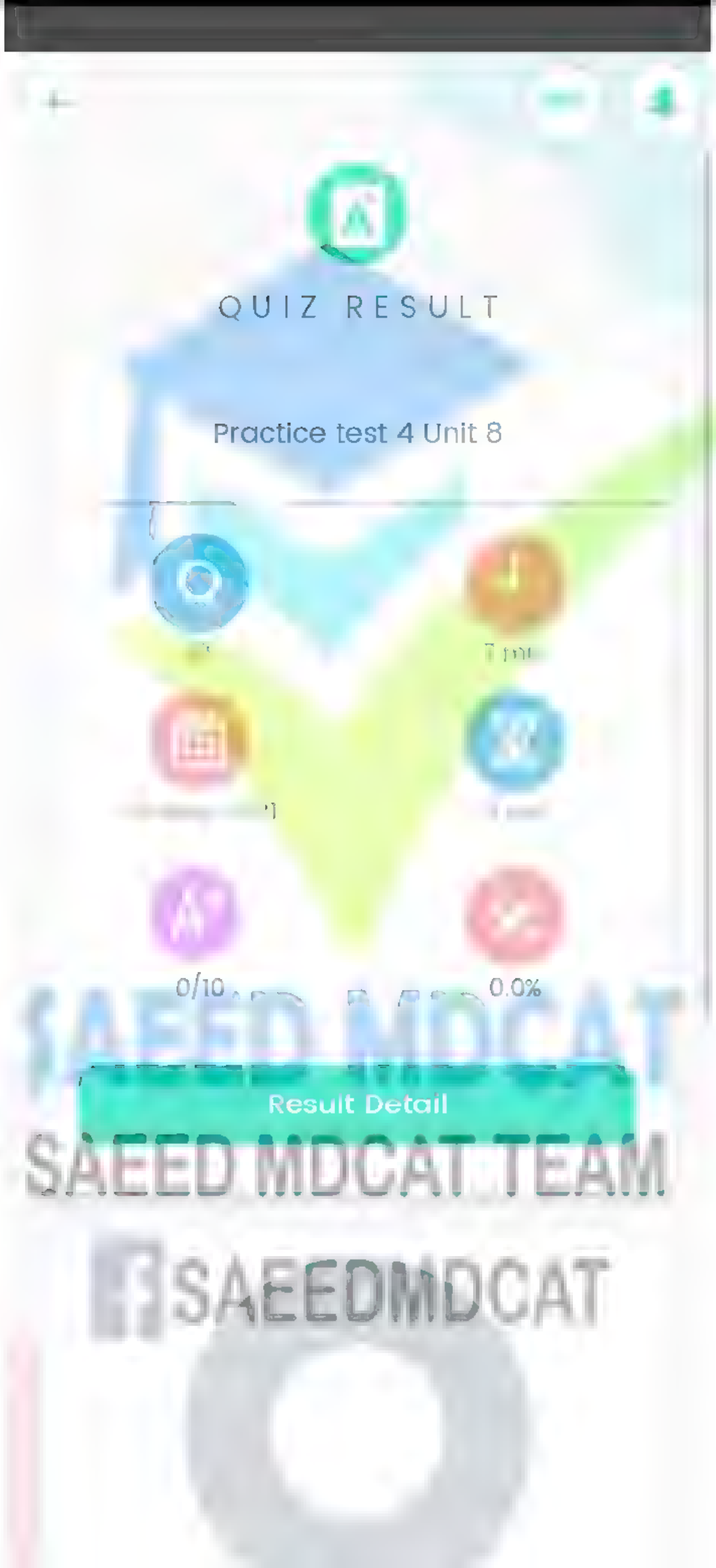
(i) Electrons (i) Protons
(iii) He^{2+} (iv) Neutrons The emission at the instant can be

i, ii, iii

i, ii, iii, iv

iv

ii, iii



Correct

Unattempted

Q : A photon while passing through a magnetic field are deflected towards

north pole

south pole

are ion zed

none of these

Explanation

Photon is charge less so, it wil not deflect in magnetic field.

Correct

Unattempted

Incorrect

2

Q : An electron accelerated through a potential difference V passes through a uniform transverse magnetic field and experience a force F. If the accelerating potential is increased to 2V, the electron in the same magnetic field will experience a force.

F

F/2

$\sqrt{2}F$

2F

Explanation

$$K.E. = \frac{1}{2}mv^2 = qV \Rightarrow v = \sqrt{\frac{2qV}{m}}$$

$$F = qvB = qB\sqrt{\frac{2qV}{m}}$$

accelerating potential is increased to 2V, the electron in the same magnetic field will experience a force.

- F
- F/2
- $\sqrt{2}F$
- 2F

Explanation

$$K.E. = \frac{1}{2}mv^2 = qV \Rightarrow v = \sqrt{\frac{2qV}{m}}$$

$$F = qvB = qB\sqrt{\frac{2qV}{m}}$$

$$\therefore qB\sqrt{\frac{2q}{m}} = constant$$

$$So\ F \propto \sqrt{V}$$

When the acceleration potential is increased to 2V then $F' \propto \sqrt{2V}$ the ratio of force become

$$\Rightarrow \frac{F'}{F} = \sqrt{\frac{2V}{V}} = \sqrt{2} \Rightarrow F' = \sqrt{2}F$$

Incorrect 3/10

Q . Two ions having masses in the ratio 1.1 and charges 1:2 are projected into uniform magnetic field perpendicular to field with speeds in the ratio 2:3 the ratio of the radii of circular parts along which the two particles move is

- 4:3
- 2:3
- 3:1
- 1:4

Explanation

As we know that

$$\frac{e}{m} = \frac{v}{Er}$$

$$r = \frac{mv}{qB}$$

$$\Rightarrow \frac{r_1}{r_2} = \frac{m_1}{m_2} \cdot \frac{v_1}{v_2} = \frac{a_2}{a_1} = 1 \cdot \frac{2}{3} \cdot \frac{2}{1} = \frac{4}{3}$$

Q : Lorentz electric force has direction

- similar to electric field
- opposite of electric field
- scalar quantity
- None

Explanation

Lorentz electric force in the direct on of electric field

Q : The electric force can

- change the speed of particle
- cannot change the speed
- has not effect
- all of these

Explanation

Information

Correct

Unattempted

Incorrect

Q : A proton moving with a constant ve ocity passes through a region of space without any change in its velocity. If E and B represent the electric and magnetic fields respectively, then this region of space may have

E=0,B≠0

E≠0,B=0

E=0,B=0

E≠0,B≠0

Explanation

Here the proton has no acceleration so E=B=0.When E=0but B≠0,but parallel to the motion of proton, there will be no force acting. When E≠0and B≠0and E, B and motion of proton (v) are mutually perpendicular, there may be no net force. Forces due to E and B cancel each other.

Correct

Unattempted

Incorrect

7/10

Q :

A strong magnetic field is applied on a stationary electron, then

A The electron moves in the direction of the field

B The electron moves in an opposite direction

C The electron remains stationary

D The electron starts spinning

Explanation

Magnetic force acts on a moving charge.

Correct

Unattempted

Incorrect

8/10

Q :

An electron enters a magnetic field whose direction is perpendicular to the velocity of the electron. Then

A The speed of the electron will increase

B The speed of the electron will decrease

C The speed of the electron will remain the same

D The velocity of the electron will remain the same

Explanation

Force acts perpendicular to the velocity in a magnetic field, so speed of electron will remain same.

Correct

Unattempted

Incorrect

9/10

Q :

When a magnetic field is applied in a direction perpendicular to the direction of cathode rays, then their

A Energy decreases

B Energy increases

C Momentum increases

D Momentum and energy remain unchanged

Explanation

Since force is perpendicular to direction of motion. energy and magnitude of momentum remains constant.

Correct

Unattempted

Incorrect

10/10

Q :

At a specific instant emission of radioactive compound is deflected in a magnetic field. The compound can emit

(i) Electrons (ii) Protons (iii) He^{2+} (iv) Neutrons The emission at the instant can be

A i, ii, iii

B i, ii, iii, iv

C iv

D ii, iii

Explanation

Charged particles deflects in magnetic field.